



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/022,864	12/18/2001	Fumiyuki Shiratani	01828/LH	6359
1933	7590	11/02/2004	EXAMINER	
FRISHAUF, HOLTZ, GOODMAN & CHICK, PC			STREGE, JOHN B	
767 THIRD AVENUE			ART UNIT	
25TH FLOOR			PAPER NUMBER	
NEW YORK, NY 10017-2023			2625	

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/022,864

Applicant(s)

SHIRATANI, FUMIYUKI

Examiner

John B Strege

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2,6-14,19 is/are rejected.
- 7) ☒ Claim(s) 3-5,15-18,20 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/18/01,3/18/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 7-13, and 19 rejected under 35 U.S.C. 102(b) as being anticipated by Hermary et al. USPN 5,615,003 (hereinafter "Hermary").

Claim 1 recites, "a 3D image acquisition apparatus comprising: a pattern projection section which projects a predetermined pattern on an object." Hermary discloses projecting a spatially coded pattern of light across an object (col. 6 lines 20-22). Claim 1 further discloses, "an imaging section which is disposed at a predetermined distance from said pattern projection section and images the object on which the predetermined pattern has been projected." Hermary discloses a receiving portion including a CCD array to receive the reflected pattern from the object (col. 12 lines 23-40). Claim 1 further recites, "a depth calculation section which detects the projection pattern projected on the object on the basis of an image acquired by said imaging section, collates the detected projection pattern and the predetermined pattern projected by the pattern projection section, and calculates a depth of respective parts of the object on the basis of the correspondency of the collation." Hermary discloses that the reflection of the pattern is detected and compared to the projected pattern to determine a one-to-one correspondence between the features of the projected pattern

Art Unit: 2625

and the reflected patterns (col. 6 lines 35-48). Depth calculation is carried out in this correspondence using the ordinary principles of triangulation from the distance between the projecting and observing locations (col. 6 lines 55-60). Claim 1 concludes reciting, "wherein the predetermined pattern projected by said pattern projection section is formed by alternately arranging areas with local maximum luminance values and areas with local minimum luminance values." Hermary discloses that one such pattern used is a series of light and dark bands (thus having local maximum and minimum values) running generally perpendicular to the direction of projection of the narrow strip and in which the dark-to-light are regularly spaced while the light to dark are irregularly spaced according to a pattern (col. 6 lines 22-35).

Claim 2 is similar limitations to claim 1, with the additional limitation reciting, "wherein the predetermined pattern projected by said pattern projection section is formed by combining patterns of a plurality of color components, and the patterns of the plurality of color components are formed by alternately arranging areas with local maximum luminance values and areas with local minimum luminance values." Hermary discloses that an alternative pattern that can be used comprises a pattern in red light and a pattern in green light. Hermary also states that patterns in differing colors using brightness and darkness may be projected simultaneously and detected simultaneously by detection systems capable of discrimination of both intensity and color. The bright and dark portions would contain local maximum and minimum luminance values.

Regarding claim 7, as seen in figure 3 the projected pattern disclosed by Hermary is a stripe pattern.

Regarding claims 8 and 12, as discussed Hermary discloses a pattern projection section which projects a spatial encoding pattern on an object by using a series of light and dark bands, thus the encoding is carried out by identifying discrete subsets of the pattern at these light and dark (max and min) positions (col. 6 lines 20-35). Hermary discloses a ROM 83 (figure 4) for storing the pattern (col. 15 lines 33-40). As discussed Hermary discloses a ccd array (light reception and memory section for a 2D image) and also as discussed discloses a depth calculation section. Finally Hermary discloses that a three dimensional image of the object can be generated by combining the results of individual two-dimensional profile data taken at a series of scans along the length of the object (col. 7 lines 1-5).

Regarding claim 9, Hermary discloses that a plurality of light detectors may be used (col. 21 lines 5-12) and since these are ccd's they would inherently have image memories. The correspondence determination section, depth calculation section, and 3d image section have already been discussed.

Claim 10 is similar to claim 1, however claim 10 is a method claim. As Hermary corresponds to a method and apparatus, the same arguments used above for the rejection of claim 1 apply equally to the rejection of claim 10.

Claim 11 is similar to claim 2, however claim 11 is a method claim. As Hermary corresponds to a method and apparatus, the same arguments used above for the rejection of claim 2 apply equally to the rejection of claim 11.

Regarding claim 13, as seen in figure 3 Hermary discloses a stripe pattern.

Regarding claim 19, as seen in figure 3 the projected pattern disclosed by Hermary is a stripe pattern.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hermary et al. USPN 5,615,003 (hereinafter "Hermary") in view of Wust et al. *Surface profile measurement using color fringe projection* (hereinafter "Wust").

Hermary discloses that a composite projected light might comprise a pattern in red light and a pattern in green light, however does not explicitly disclose a blue light.

Wust discloses projecting three overlapping color fringe patterns and then determining the surface topography by processing the red, green, and blue components of the color signal. This allows for faster processing (page 195 last paragraph in the right column continued on to the second column).

Hermary and Wust are analogous art because they are from the same field of endeavor of surface profile measurement.

At the time of the invention it would have been obvious to one of ordinary skill in the art to use the RGB color components. Hermary discloses that different color components may be used, and Wust teaches that by using RGB faster processing will result. Thus the motivation for using RGB would be to enable faster processing.

Art Unit: 2625

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Hermary and Wust to obtain the invention as specified in claim 6.

Claim 14 is dependent on claim 12 (rejected by Hermary) and discloses the same limitation as claim 6, thus the same arguments used for the rejection of claim 6 apply equally to claim 14.

Allowable Subject Matter

Claims 3-5, 15-18, and 20-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

USPN 6,252,623 Three dimensional imaging system.

USPN 6,549,288 Structured-light, triangulation-based three-dimensional digitizer.

Contact Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is (703) 305-8679. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

Art Unit: 2625

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JS



BHAVESH M. MEHTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600